

## **WHAT IS CLAIMED IS**

1. A connector lock mechanism for locking the connected condition of a set of male and female connectors to be engaged with each other, the connector lock mechanism comprising:

5 a flexible arm disposed on one of the male and female connectors and extending along a direction in which one connector can be engaged with the other connector;

an engaging portion disposed on the flexible arm;

10 an arm guide surface disposed on the other connector for flexing the flexible arm until the length of the mutual engagement between the two connectors reaches a preset length;

a securing member disposed on the other connector, said securing member securing the engaging portion of the flexible arm to thereby prevent the two connectors from being removed from each other when the connector mutual engagement length reaches the preset length; and

15 a connector removing mechanism including a flexible elastic piece formed integrally with said one connector and a push-out guide surface which is formed integrally with said other connector and also which, when said two connectors are operated for their mutual engagement, deforms said flexible elastic piece elastically to thereby generate a push-out force separating said two connectors from each other in 20 their mutually removing directions, wherein the elasticity of said flexible elastic piece and the inclination angle of said push-out guide surface are set such that said push-out force generated by said connector removing mechanism is greater than contact

resistance caused by mutual connection between male- and female-type terminals respectively held within their associated connectors.

2. The connector lock mechanism of claim 1, wherein said flexible arm serves also as said flexible elastic piece and said arm guide surface serves also as said push-out guide surface.

3. The connector lock mechanism of claim 1, wherein, in the range of the mutual engagement between said two connectors, the angle of said push-out guide surface is changed in the intermediate portion thereof so that a greater push-out force can be generated in the mutually connected range of said male- and female-type terminals than in the mutually unconnected range of said male- and female-type terminals.

4. The connector lock mechanism of claim 1, wherein said flexible elastic piece is formed integrally with said flexible arm, and wherein said connector lock mechanism further comprises a wrong operation preventive piece formed integrally with said flexible arm, said wrong operation preventive piece preventing said two connectors from being engaged with each other while said flexible arm is flexed in a locking removed condition.

5. The connector lock mechanism of claim 1, wherein said flexible elastic piece and said push-out guide surface are provided in at least two.

6. The connector lock mechanism of claim 1, wherein, while said flexible arm is held in its flexed condition, the flexed condition of said flexible elastic piece generates a push-out force acting said two connectors in their mutually removing directions and, if said two connectors are completely engaged with each other, the

5       flexed condition of said flexible arm and the flexed condition of said flexible elastic piece are removed, thereby removing said push-out force acting in said connectors mutually removing directions.

7.       A connector arrangement comprising:

a first connector including a flexible arm disposed thereon; and

5       a second connector including an arm guide member disposed on an inner surface thereof, said arm guide member having an inclined push-out guide surface for gradually deflecting the flexible arm as said connectors are engaged with each other, said deflection generating a push-out force separating said two connectors from each other in their mutually removing directions, wherein the elasticity of said flexible arm and the inclination angle of said push-out guide surface are set such that said push-out force generated thereby is greater than contact resistance caused by 10      mutual connection between male- and female-type terminals respectively held within their associated connectors.

8.       The connector arrangement of claim 7, wherein said flexible arm includes an engaging portion which engages said arm guide member when said connectors are fully engaged.

9.       The connector arrangement of claim 7, further comprising a locking arm extending from said first connector and having a locking projection, and a securing member disposed on said second connector, said locking projection engaging said securing member when said connectors are fully engaged.

10. The connector arrangement of claim 9, wherein said first connector includes a pair of said flexible arms and said second connector includes a pair of said arm guide members respectively mateable therewith.

11. The connector arrangement of claim 10, wherein said flexible arms extend from said locking arm.

12. The connector arrangement of claim 11, wherein said flexible arm includes an engaging portion which engages said arm guide member when said connectors are fully engaged.

13. The connector arrangement of claim 7, wherein said first connector includes a pair of said flexible arms and said second connector includes a pair of said guide members respectively mateable therewith.

14. The connector arrangement of claim 7, wherein a first portion of said inclined guide surface is inclined at a predetermined angle and a second portion is inclined at an angle greater than said predetermined angle.

15. A connector arrangement comprising:  
a first connector including a flexible arm disposed thereon, said flexible arm having an engaging projection extending therefrom; and

a second connector including an arm guide member disposed on an inner surface thereof, said arm guide member having an inclined push-out guide surface which is contacted by said engaging projection for gradually deflecting the flexible arm as said connectors are engaged with each other, said deflection generating a push-out force separating said two connectors from each other in their

10       mutually removing directions, wherein the elasticity of said flexible arm and the inclination angle of said push-out guide surface are set such that said push-out force generated thereby is greater than contact resistance caused by mutual connection between male- and female-type terminals respectively held within their associated connectors.

16.      The connector arrangement of claim 15, wherein said flexible arm includes a pair of arm members which are joined together at distal ends thereof.

17.      The connector arrangement of claim 16, wherein said first connector includes a pair of said engaging projections respectively extending from said arm members and said second connector includes a pair of said arm guide members respectively mateable with said engaging projections.

18.      The connector arrangement of claim 17, wherein said first connector includes withdrawal prevention pieces respectively extending inwardly from said arm members and said second connector includes an obstacle plate, said prevention pieces abutting against said obstacle plate when said first connector is attempted to be engaged with said second connector when said flexible arm is deflected.

5           19.     The connector arrangement of claim 15, wherein said flexible arm has a locking projection extending therefrom and said second connector includes a securing member which is engageable with said locking projection when said first and second connectors are fully engaged.

20.     The connector arrangement of claim 15, wherein a first portion of said inclined guide surface is inclined at a predetermined angle and a second portion is inclined at an angle greater than said predetermined angle.